



# A Clinical Profile of Dengue in Children of Tertiary Care Hospitals in Davangere

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## ABSTRACT

**Background:** Dengue fever is a rapidly spreading public health problem. The dengue fever shows high morbidity especially among children and sometime with severe complications followed by deaths. This research was done to study the clinical profile of confirmed dengue fever cases among children.

**Materials and Methods:** This is a hospital based cross sectional study. Confirmed dengue cases in children up to age 14 were the study participants. Pre designed and pre tested proforma was used to collect the information of confirmed dengue fever cases.  $\chi^2$  test, Fisher's exact test and one way ANOVA were applied.

**Results:** Out of 150 paediatric dengue cases 41% were in the age group of 5-9 years. 74.7% of cases were from class III, IV and V socioeconomic status. 44.7% cases were reported in post-monsoon period. Purpura (19.3 %) was predominant bleeding manifestation. The mean haemoglobin and haematocrit values were  $10.7 \pm 2.6$  gm/dl and  $32.5 \pm 7.6\%$ , respectively. The mean platelet count was  $136332.67 \pm 115374.59$ /cumm.

**Conclusion:** The clinical manifestation of dengue varies widely ranging from undifferentiated fever to shock thus peripheral health worker and medical officer should be aware of the clinical profile of dengue infection for appropriate action.

**Key words:** Dengue; Manifestations; factors; haemoglobin.

## INTRODUCTION

Dengue fever is a rapidly spreading public health problem in the world as well as India. Now and then in our country outbreaks are occurring since 1812<sup>1</sup>. The dengue fever shows high morbidity and sometime with severe complications followed by deaths. The mortality is observed more among children. Dengue haemorrhagic fever (DHF) is more common in children less than 15 years of age in hyperendemic areas, in association with repeated dengue infections. An estimated 500 000 people with DHF require hospitalization each year. A very large proportion (approximately 90%) of them are children aged less than five years, and about 2.5% of those affected die<sup>2</sup>.

The clinical presentation of dengue varies from asymptomatic or undifferentiated febrile illness or

dengue haemorrhagic fever including dengue shock syndrome. All four serotypes of dengue associated with epidemics with varying degree of severity. Outbreak of dengue was noted in the year 2012 in Davangere in order to understand the clinical presentation and laboratory finding of dengue in children the current study has been taken up, with the objective of to study the clinical profile of confirmed dengue fever cases among children at tertiary care hospitals in Davangere.

## MATERIALS AND METHODS

The present study was approved by institutional ethical committee. It was a hospital based cross sectional study, conducted for a period of 1 year from 1<sup>st</sup> Jan 2014 to 31<sup>st</sup> Dec 2014. Data collected using Pre-structured and pretested questionnaire,

the study subjects were confirmed pediatric dengue fever cases in the age group of 0 - 14 years, face to face interview with informant (parents/relatives of the child) and clinical examination was done for filling up of predesigned, pre-tested questionnaire for all confirmed cases of dengue after obtaining informed consent.

The definitions of dengue fever (DF), dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) were followed as per guidelines of WHO<sup>2</sup> / Indian guidelines<sup>3</sup>. Those children positive for NS1 Ag and/or Mac ELISA were taken as confirmed dengue case as per National Vector Borne Disease Control Programme (NVBDCP) guidelines<sup>4</sup>. The Modified B.G. Prasad classification of socio-economic status was used for classification of socio-economic status of study subjects<sup>5</sup>.

The sample size of study subjects had been determined by estimating the confirmed dengue fever cases from Davangere district malaria office reports for the year 2012.

Total number of confirmed dengue fever cases in all age groups is 486. The number of confirmed dengue fever cases among children (0-14years) is 195 (40%). The sample size calculated using the formula  $n=4pq/d^2$  where n= Sample size; p=confirmed dengue fever case (0-14years) is 40; q=100-p; and d=admissible error (20% of p). So the calculated sample size n=150.

The sample size of confirmed dengue fever cases to be studied (0-14years) is 150. During the study period of one year the sample size may decrease because the epidemic may decline.

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The data was compiled in Microsoft (MS) Excel work sheet and analysed using SPSS (Statistical Package for Social Sciences) software version 16.0. For the most of the variables chi-square ( $\chi^2$ ) test was applied, if 20% or more than 20% have expected count less than 5 then fisher's exact test was applied, one way ANOVA was used to analyse the laboratories parameters.

**RESULTS**

In the present study the mean age of paediatric dengue cases was 7.7 ± 4 years. 41% of these cases were in the age group of 5 -9 years. Out of 150 cases 76 were males and 74 were females, in all age group males were more than females except in age group of 5 - 9 females were more. The ratio of M:F = 1.03:1.(Table 1).

Class III, IV and V socioeconomic status accounts for 74.7% (112) paediatric dengue cases and major-

ity of cases belongs to rural area, of which class III accounts for 30% of cases. The ratio U:R = 1:1.6 (Table 2).

Majority of cases reported in July month 22.7 %, followed by August 11.3%, September 13.3% and December 14.7%. (Figure 1).

**Table 1: Distribution of paediatric dengue cases according to their age groups and sex**

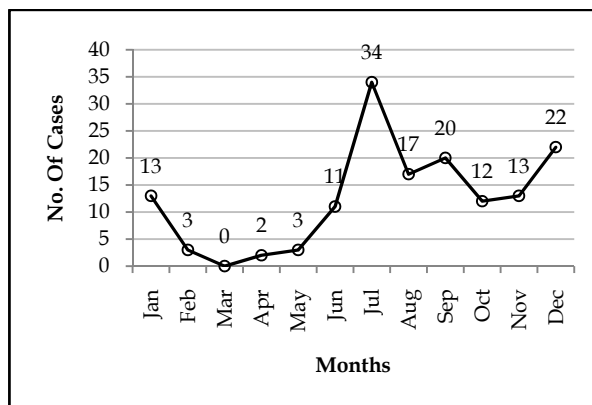
Age (yrs)	Male (n=76)	Female (n=74)	Total (n=150)
0 - 4	19 (25)	17 (22.97)	36 (24)
5 - 9	28 (36.84)	34 (45.94)	62 (41)
10 - 14	29 (38.16)	23 (31.08)	52 (35)

Figures in parenthesis indicate percentage.

**Table 2: Distribution of paediatric dengue cases according to socio-economic status**

Socioeconomic status	No. of cases Urban (n=58)	Rural (n=92)	Total (n=150)
I	3 (5.17)	8 (8.7)	11 (7.3)
II	10 (17.24)	17 (18.48)	27 (18)
III	19 (32.76)	25 (27.17)	44 (29.3)
IV	12 (20.69)	24 (26.09)	36 (24)
V	14 (24.14)	18 (19.57)	32 (21.3)

Figures in parenthesis indicate percentage



**Figure 1: Month wise distribution of paediatric dengue cases**

100% children presented with fever as the predominant complaint followed by vomiting 58.7%, abdominal pain 50%, cough 40.7%, retro-orbital pain 39.3%, arthralgia 32.7% and headache 18% (Table 3).

The bleeding manifestation was found in 30.7 % paediatric dengue cases of which 1.1% in DF, 70.3% in DHF and 90.5% in DSS and this was significant. Has the dengue fever progress towards DHF and DSS, the bleeding manifestations increases. The purpura (19.3 %) was predominant bleeding manifestation followed by melena (16.7%) (Table 3).

**Table 3: Distribution of paediatric dengue cases according to symptomatology**

Symptoms	No. of cases			Total (n=150)	P value
	DF (%) (n=92)	DHF (%) (n=37)	DSS (%) (n=21)		
Fever	92 (100)	37 (100)	21 (100)	150 (100)	-
Cough	35 (38)	15 (40.5)	11 (52.4)	61 (40.7)	0.483 <sup>a</sup>
Vomiting	53 (57.6)	29 (78.4)	6 (28.6)	88 (58.7)	<b>0.001<sup>a</sup></b>
Abdominal pain	45 (48.9)	18 (48.6)	12 (57.1)	75 (50)	0.779 <sup>a</sup>
Headache	17 (18.5)	6 (16.2)	4 (19)	27 (18)	0.947 <sup>a</sup>
Arthralgia	30 (32.6)	16 (43.2)	3 (14.3)	49 (32.7)	0.078 <sup>a</sup>
Retro-orbital pain	38 (41.3)	13 (35.1)	8 (38.1)	59 (39.3)	0.804 <sup>a</sup>
Gum bleeding	0 (0)	1(2.70)	1 (4.76)	2 (1.3)	0.164 <sup>b</sup>
Epistaxis	0 (0)	4 (10.81)	5 (23.80)	9 (6)	0.0001 <sup>b</sup>
Melena	0 (0)	13 (35.13)	12 (57.14)	25 (16.7)	0.0001 <sup>a</sup>
Purpura	1(1.08)	10 (27.03)	19 (90.47)	29 (19.3)	0.0001 <sup>a</sup>

<sup>a</sup>chi square, <sup>b</sup>Fisher's exact. The numbers in the bracket for are percentages to the column total

**Table 4: Distribution of paediatric dengue cases according to tourniquet test**

Tourniquet test	No. of cases			Total (%) (n=150)	P* value
	DF (%) (n=92)	DHF (%) (n=37)	DSS (%) (n=21)		
Positive	0 (0)	10 (27.02)	19 (90.47)	29 (19.3)	0.0001
Negative	92 (100)	27 (72.97)	2 (9.52)	121 (80.6)	
Total	92	37	21	150	

\*Chi-square

**Table 5: Distribution of paediatric dengue cases according to haemoglobin, haematocrit and platelet count**

Indicators	No. of cases			Total (%)	P* value
	DF (%) (n=92)	DHF (%) (n=37)	DSS (%) (n=21)		
<b>Haemoglobin (gm%)</b>					
< 8	14 (15.2)	3 (8.1)	2 (9.5)	19 (12.7)	0.135
8 - 12	56 (60.9)	21 (56.8)	10 (47.6)	87 (58)	
> 12	22 (23.9)	13 (35.1)	9 (42.9)	44 (29.3)	
Mean $\pm$ SD	10.3 $\pm$ 2.2	11.5 $\pm$ 2.9	11.4 $\pm$ 3.5	10.7 $\pm$ 2.6	
<b>Haematocrit (%)</b>					
< 35	64 (69.6)	20 (54.1)	11 (52.4)	95 (63.3)	0.128
35 - 50	28 (30.4)	14 (37.8)	10 (47.6)	52 (34.6)	
> 50	0	3 (8.1)	0	3 (8.1)	
Mean $\pm$ SD	31.2 $\pm$ 6.4	35 $\pm$ 8.5	33.4 $\pm$ 9.2	32.5 $\pm$ 7.6	
<b>Platelet count</b>					
< 20000	0	2 (5.4)	4 (19.1)	6 (4)	0.0001
20000 - 100000	12 (13)	35 (94.6)	16 (76.2)	63 (42)	
100000 - 200000	49 (53.3)	0	1 (4.8)	50 (33.3)	
> 200000	31 (33.7)	0	0	31 (20.7)	
Mean $\pm$ SD	192843 $\pm$ 114865	48864 $\pm$ 146134	42871 $\pm$ 27142	1363327 $\pm$ 115374	

\*One way ANOVA

The Tourniquet test was positive in 19.3% of paediatric dengue cases, of which 73% in DHF and 90.5% in DSS and this was statistically highly significant (**Table 4**).

The mean haemoglobin in the present study was 10.7  $\pm$  2.6 gm/dl with the range of 4.5 gm/dl to 21.2 gm/dl. The mean haemoglobin level in DF is 10.3  $\pm$  2.2 gm/dl, in DHF is 11.5  $\pm$  2.9 gm/dl and in DSS is 11.4  $\pm$  3.5 (Table 6). There was a no significant statistical correlation between haemoglobin and severity of disease among the clinical subgroups of dengue (**Table 5**).

The mean haematocrit in the present study was 32.5  $\pm$  7.6% with the range of 6.7% to 51.2% (Table 6). There was a no significant statistical correlation between haematocrit and severity of disease among the clinical subgroups of dengue(**Table 5**).

The range of platelet count was 10800 to 726000 / cumm with a mean of 136332.67 / cumm(**Table 5**).

## DISCUSSION

In the present study 41% of these cases were in the age group of 5 -9 years, a study by Kulkarni MJ et al<sup>6</sup> in Jaipur in 2010 majority cases reported in age

group of 6 – 12 years (45.8%), in ArulkumaranArunagirinathan et al<sup>7</sup> study in Puducherry in 2015 age group 5 – 15 (58%) years was affected, Kale AV et al<sup>8</sup> study in Maharashtra 11 – 15 years age group was affected. The ratio of M:F = 1.03:1, which is similar to the observations made in the studies of Manjith Narayanan et al<sup>9</sup>, Abmshahidulalam et al<sup>10</sup>. 43.3% of paediatric dengue cases were reported during monsoon period and 44.7% of paediatric dengue cases were reported during post monsoon period, these findings were similar to study by Prafulla Dutta et al<sup>11</sup>

In the present study 100% had fever, similar findings noted in<sup>7,8,10,12,13</sup> (Arulkumaran Arunagirinathan et al, Kale AV et al, Abmshahidulalam et al, Joshi R, Adarsh Eregowda) 58.7% had vomiting, most of the studies reported between 40% to 45%<sup>6,8,11,12</sup> Abmshahidulalam et al<sup>10</sup> reported 31% and Kale AV et al<sup>8</sup> 64.67%. In the present study 50% had abdominal pain similar finding noted in study by Kale AV et al<sup>8</sup>, the studies ArulkumaranArunagirinathan et al, Abmshahidulalam et al and Joshi R, Manjunath M N<sup>7,10,12,14</sup> reported between 32 to 38%, Adarsh Eregowda<sup>13</sup> studies reported 65%. In the present study 18% had headache similar finding noted in Abmshahidulalam et al<sup>10</sup>, studies Kale AV et al, Adarsh Eregowda and Manjunath M N<sup>8,13,14</sup> reported between 27% to 38%. In the present study 32.7% had arthralgia wide variation was observed across several studies Kale AV et al<sup>8</sup> reported 65% and in study by Manjunath M N<sup>14</sup> was 13%. In the present study 39.3% had retro-orbital pain similar finding observed in Kale AV et al<sup>8</sup> study.

In present study purpura (19.3 %) was predominant bleeding manifestation followed by melena (16.7%). In Kulkarni MJ et al<sup>6</sup> study 44.5 % was bleeding manifestation of which 25% was epistaxis, in Joshi R<sup>12</sup> study 38.5% had bleeding manifestation 68.6 % malena, 31.8% skin bleeding, 18.2% epistaxis, in Manjunath M N<sup>14</sup> study 4.5% had bleeding manifestation of which 87% skin bleeding and 4% epistaxis. The Tourniquet test was positive in 19.3% of paediatric dengue cases, it is 25% in Delhi study by Sunil Gomber et al<sup>15</sup>, 14% in Joshi R<sup>12</sup> study, 34.67% in Kale AV et al<sup>8</sup> study in Maharashtra

Platelet counts carry one of the most important key for diagnoses. On taking the WHO limit of <100000/cumm for low platelet count 46% of children had in the present study. The mean platelet in the present study was 136332.67/cumm with range of 10800, to 726000/cumm. Only platelet counts at admission was not taken as an indicator for bleeding tendencies. This suggest that other factors like platelet dysfunction or disseminated intravascular coagulation may have a role in bleeding in dengue

fever cases. However studies which include only DHF cases show correlation between low platelet count and bleeding manifestation<sup>16</sup>. The studies by Narayan et al<sup>9</sup> and Sunil Gomber et al<sup>15</sup> have documented the same. Platelet count provides a very useful means of diagnoses at the screening level. Hence platelet count was a sensitive indicator for diagnosis. Bleeding manifestations are more frequent with low platelet count.

## CONCLUSION

The clinical manifestation of dengue varies vary widely ranging from undifferentiated fever to shock and severity is more in vulnerable population thus peripheral health worker and medical officer should be aware of the clinical profile of dengue infection for appropriate action and we can also control further spread and possible outbreaks.

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